DIRECTORATE FOR QUALITY AND STANDARDS IN EDUCATION
Department of Curriculum Management
Educational Assessment Unit

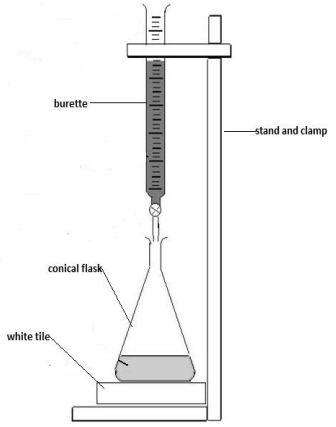
Track 2

Annual Examinations for Secondary Schools 2014

FORM 4 CHEMISTRY MARKING SCHEME

Question		Requirement	Marks	Additional Guidelines
1a.	(i)	Sodium	1	Accept any reasonable answer.
	(ii)	Carbon	1	
	(iii)	Iron	1	Accept any reasonable answer.
	(iv)	Bromine	1	Also accept mercury.
	(v)	Fluorine	1	
1b.	(i)	Cs	1	
	(ii)	Be	1	
	(iii)	Fe	1	Also accept Co and Ni.
	(iv)	K	1	Accept any alkali metal.
	(v)	Cu	1	Also accept aluminium.
2a.		Grey black	1	Accept dark grey.
2b.		Purple	1	Accept violet.
2c.		Red	1	
2d.		Blue	1	
2e.		Golden yellow	1	
2f.		White	1	
2g.		Brown	1	
2h.		White	1	
2i.		Green	1	
2j.		Brown	1	
3a.	(i)	sodium, magnesium, zinc, iron, copper	1	
	(ii)	Iron and copper	1	
	(iii)	Coating of a metal with a thin layer of a less reactive metal to protect it from corrosion	3	Coating (1 mark) Less reactive metal (1mark) Protect it from corrosion (1mark)
3b.	(i)	fluorine, chlorine, bromine, iodine	1	
	(ii)	They react by gaining electrons.	1	Accept any reasonable answer such as reference to physical properties.
	(iii)	Chlorine is smaller so there is less distance between outer shell and nucleus. Chlorine has fewer electrons and therefore less shielding.	2	
	(iv)	Potassium fluoride is an ionic substance and therefore it is soluble.	1	Other potassium halides are soluble so likewise KF is soluble.

4a.		Haber, nitrogen, hydrogen, 200, iron, 450	3	½ mark each
4b.		$3H_2 + N_2 \rightleftharpoons 2NH_3$	2	1 mark if all formulae are correct 1 mark if all balancing is correct
4c.		Ammonia changes the colour of damp red litmus paper to blue.	2	It forms white clouds when it comes in contact with concentrated hydrochloric acid fumes.
4d.	(i)	$NH_3 + HNO_3 \rightarrow NH_4NO_3$	2	1 mark if all formulae are correct 1 mark if all balancing is correct
	(ii)	Fertilizer	1	Accept any reasonable answer.
5a.	(i)	2,8,1	1	
	(ii)	The number of electrons in the last shell shows the group to which it belongs.	1	
	(iii)	It decreases from left to right.	1	
	(iv)	It reacts with both acids and alkalis.	1	
5b.		$SiCl_4$ Na_2O SCl_2	3	
5c.	(i)	Nitrogen dioxide	1	Accept carbon dioxide.
	(ii)	4	1	Accept pH from 3-5.
	(iii)	Erosion of limestone facades	1	Accept any reasonable answer.
6a.		A= copper (II) carbonate B= copper (II) oxide C= copper (II) nitrate D= copper (II) hydroxide	4	1 mark each name Deduct ½ mark when oxidation state of copper is missing. Do not accept formulae.
6b.	(i)	$CuCO_3(s) \rightarrow CuO(s) + CO_2(g)$	3	1 mark if all formulae are correct 1 mark if all balancing is correct (and formulae are correct too) 1 mark if all state symbols are correct ½ mark if only 1 state symbol is incorrect
	(ii)	$Cu(NO_3)_2(aq) + 2NaOH(aq) \rightarrow Cu(OH)_2(s) + 2NaNO_3(aq)$	3	1 mark if all formulae are correct 1 mark if all balancing is correct (and formulae are correct too) 1 mark if all state symbols are correct ½ mark if only 1 state symbol is incorrect

7a.	(i)	$H_2SO_4(aq) + 2NaOH(aq) \rightarrow 2H_2O(l) + Na_2SO_4(aq)$	2	½ mark for each state symbol
	(ii)		6	2 marks for correct drawing of diagram 1 mark for each label
	(iii)	Pink	1	
	(iv)	The colour of the solution changes from colourless to light pink.	1	Accept any reasonable answer.
7b.	(i)	19.55 cm^3, 19.40 cm^3, 19.30 cm^3, 19.35 cm^3	2	½ mark for each number
	(ii)	19.55 cm^3	1	Accept titration 1.
	(iii)	$\frac{19.40 + 19.30 + 19.35}{3} = 19.35 cm^3$	1	½ mark for working ½ mark for correct answer
	(iv)	0.5 moles H_2SO_4 in 1000 cm^3 ? moles H_2SO_4 in 25 cm^3 $\frac{0.5 \times 25}{1000} = 0.0125$ moles	2	1 mark for correct working 1 mark for correct answer
	(v)	1:2	1	
	(vi)	0.0125 moles H_2SO_4 react with 0.0125 x 2 moles of NaOH = 0.025 moles	1	
	(vii)	0.025 moles NaOH in 19.35 cm^3 ? moles NaOH in 1000 cm^3 $\frac{0.025 \times 1000}{19.35} = 1.29$ mol dm^{-3}	2	1 mark for correct working 1 mark for correct answer Allot full marks if 7b(iii) is incorrect but all working is correct.
8a.	(i)	Electroplating	1	
	(ii)	Negative	1	
	(iii)	Flow of ions	1	
	(iv)	Ag^+, NO_3^-, H^+, OH^-.	2	½ mark each
	(v)	No, because plastic is not a conductor.	2	Accept any reasonable answer.
8b.	(i)	$Ag(s) - e^- \rightarrow Ag^+(aq)$	3	1 mark for correct formulae 1 mark for correct balancing 1 mark for correct state symbols
	(ii)	$Ag^+(aq) + e^- \rightarrow Ag(s)$,	3	1 mark for correct formulae 1 mark for correct balancing 1 mark for correct state symbols

8c.	(i)	Q=It Q = 0.5 x 50 x 60 = 1500 C	3	1 mark for equation 1 mark for working 1 mark for correct answer
	(ii)	96500 C produce 1 mole of silver 1500 C produce ? $\frac{1500 \times 1}{96500}$ = 0.016 moles	2	1 mark for working 1 mark for correct answer
	(iii)	1 mole of silver = 108 g 0.016 moles of silver = ? $\frac{0.016 \times 108}{1}$ = 1.728 g	2	1 mark for working 1 mark for correct answer
9a.	(i)	The magnesium burns with a dazzling bright white flame. White ash is produced.	2	Accept any other reasonable observation.
	(ii)	She should not look directly at the flame.	1	Accept any other reasonable precaution.
	(iii)	Electronic balance	1	Also accept digital balance.
	(iv)	Mg is being oxidized as it combines with oxygen to form magnesium oxide.	3	
9b.	(i)	$2Mg(s) + O_2(\mathbf{g}) \rightarrow 2MgO(\mathbf{s})$	1	½ mark for each missing state symbol
	(ii)	40 g	2	1 mark for value 1 mark for unit
	(iii)	40 g of MgO = 1 mole 8 g of MgO = ? $\frac{8 \times 1}{40}$ = 0.2 moles	2	1 mark for working 1 mark for correct answer
	(iv)	Ratio Mg : MgO is 1 : 1 Therefore 0.2 moles MgO are produced from 0.2 moles of Mg.	3	1 mark for ratio 1 mark for correct answer 1 mark for correct unit
	(v)	1 mole of Mg = 24 g 0.2 moles = ? $\frac{0.2 \times 24}{1}$ = 4.8 g	2	1 mark for working 1 mark for correct answer
	(vi)	$\frac{V_1}{T_1} = \frac{V_2}{T_2}$ $\frac{2.24}{273} = \frac{V_2}{333}$ $V_2 = \frac{2.24 \times 333}{273}$ = 2.73 dm^3	3	1 mark for working 1 mark for correct answer 1 mark for correct unit